

UNK



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Letter from the Department

In the past year, we have been busy adding new instruments to our department; we have purchased another 3D printer for printing microfluidics and mesofluidic devices and will be purchasing a new NMR this next year, which will arrive this following Spring (2017). We will be retiring our old NMR and will be upgrading it with a 400 MHz NMR. Additionally, we have many professors that have secured funding this past year: Dr. Haishi Cao and Dr. Kristy Kounovsky-Shafer were awarded the NIH NE-EPSCoR INBRE award, where they will be working on biomedical research projects. Dr. Cao also received funding from the Nebraska Research Initiative for designing fluorescent sensors. Drs. Darveau and Exstrom received funding from NASA for working on tungsten selenide solar cells. A number of students have presented at local, regional, and national meetings this past year: 22 students presented at the regional ACS meeting in St. Joseph, MO, 9 students presented at the Nebraska Academy of Sciences in Lincoln, NE, 3 students presented at National Conferences on Undergraduate Research (NCUR) and 3 students presented at Biophysics Meeting in Los Angeles, CA. Congratulations to all of our faculty and our students for their hard work in the lab!



Dr. Scott Darveau, Chair of the Chemistry Department

Don Fox Lecturer, Fall 2015

Charles E. Sizer III, Ph.D.



Charles Sizer III obtained his undergraduate degree in chemistry with a minor in Mathematics from UNK in 1971 and received his M.S. degree in 1973 and his Ph.D. in Food Science and Nutrition in 1978 from Colorado State University. After graduation he was a faculty member at Iowa State University and Illinois Institute of Technology. Additionally, he was involved in the following companies: Tetra Pak, Cambrooke Therapeutics, and Dairyvative Technologies. He gave a presentation entitled "A new Technology for Reducing the Carbon Footprint of Dairy Products in the Anthropocene Epoch?" In his presentation, he went over the research he has been involved in as CEO of Dairyvative Technologies, LLC, where they are working on concentrating milk into a shelf-stable form. The milk concentrate can be

distributed in large totes over large distances. The technology has potential to change the dynamics of international trade in milk.



Chemistry Club Picnic



Our chemistry club picnic was held on August 24, 2015 in Harmon park. We had great weather for the picnic. Faculty and students got together to enjoy Dr. Darveau's barbecuing.

Meet a Graduating Senior

Anthony Donovan

Anthony is a UNK Chemistry major from Anthony Donovan graduated this Spring (2016) with a Chemistry Comprehensive degree with a Biochemistry Emphasis from UNK. He has been accepted into the UNMC College of Pharmacy for the Fall.

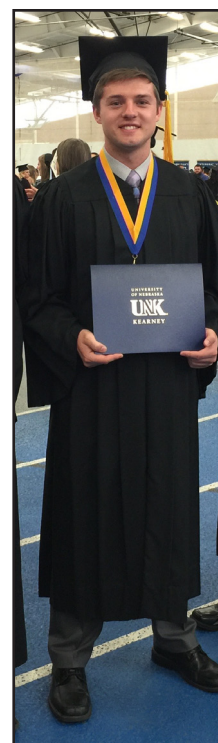
Anthony came to UNK from Kearney Catholic High School and developed his strong interest in chemistry as a junior there. He credits his math and chemistry teacher with catalyzing his interest in science and chemistry. His interest in pharmacy has developed over time. He has worked locally at a pharmacy as well as an undergraduate researcher and has enjoyed both.

Research at UNK

Anthony worked for Dr. Annette Moser on a project that used a combination of zonal elution and frontal analysis affinity chromatography to measure the binding constants and number of binding sites of atrazine and several of its metabolites (hydroxyatrazine, deisopropylatrazine, and desethylatrazine). When asked what he thought the benefits of undergraduate research for our students were, he said it was good to be exposed to instruments and techniques discussed in lectures. As a sophomore at UNK, he not only performed HPLC but also used the GC-MS and UV-Vis instrumentation for his research. Undergraduate research also allowed him to experience the application of science and prepare him for a Summer research project at UNMC.

Additional Research

At UNMC, Anthony worked on synthesizing a molecule that was an analogue of a molecule that showed activity toward schistosomiasis, a disease caused by parasitic flatworms that cause serious organ damage. He was part of a larger study on the Structure Activity Relationship on drugs for treating this disease that is common in tropical regions of the world.





Meet one of our Faculty Members

Prof. Kristy Kounovsky-Shafer

Where are you from? I am originally from Norfolk, NE. After undergraduate school, I went to the University of Wisconsin - Madison for my Ph.D. Once I completed my Ph.D. in Madison, I accepted the position at UNK and I have been here ever since.

What is your favorite part about teaching at UNK? Every day brings something different and you never know what questions you will be asked in the classroom or in your office. I like to come up with analogies to make a concept easier to understand, so I try to figure out better analogies or ways to tie in everyday objects to explain Chemistry.

What are your favorite things to do when you are not in the lab or teaching? I enjoy playing and watching sports, as well as reading books. I love to play tennis, softball and volleyball. I also watch a lot of tennis, as my husband is the assistant coach for the UNK men's and women's team. Additionally, I have a five year old daughter, so most of my time outside of UNK is spent playing with her.

What is your favorite part about being a professor? I like the combination of teaching and research. I can bring the research I do in to the classroom and visa versa.

Research Summary

My research interests are the following: 1) fabrication of microfluidic and mesofluidic devices and 2) developing devices to concentrate "large" DNA molecules (>500 kb) for genome analysis. One of the biggest challenges in concentrating large DNA molecules is the fragility of handling DNA molecules of that size. The length of a 500 kb DNA molecule is ~160 μm , but the width is only ~2 nm in size. You can think of one DNA molecule as one piece of yarn that is as long as 3.5 football fields. You have to be very careful when moving it around. My research is focused on making devices to concentrate these molecules, so they can be used in other genome analysis platforms to determine the information encoded in DNA.



Holiday Celebration

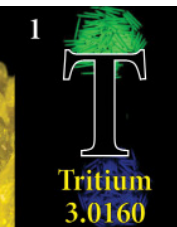
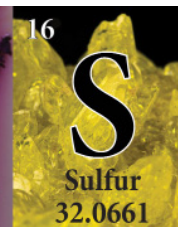


Our chemistry students showing their "chemical" holiday spirit.

Summer Research



Some of the students doing research this summer in our research groups (Summer 2016).



Recognition of Our Graduates

Students listed have a Chemistry major or minor. Students that graduate with a Chemistry major have an asterisk (*).

Summer 2015

Jesse Houdek; Chapman, NE*

Fall 2015

Rebecca Best; Kearney, NE
Gunwoo Kim; South Korea*
Anthony Munch; Kearney, NE*
Reed Murbach; Kearney, NE*
David Rohrer; Kearney, NE*
Tracy Shafer; Elm Creek, NE*

Spring 2016

Dusty Broxterman; Grand Island, NE*
Christopher Curry; Kearney, NE*
Anthony Donovan; Kearney, NE*
Joshua Edgar; Omaha, NE*
Emily Kaslon; Kearney, NE*
Lauren Reiman; Kearney, NE*
Joseph Smidt; North Platte, NE
Taylor Stowater; Kearney, NE